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# NOVELTIES IN THE LAURACEAE FROM VENEZUELAN GUAYANA<sup>1</sup>

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Henk van der Werff<sup>2</sup>

## ABSTRACT

Eleven new species (*Licaria tomentosa*, *Ocotea flavantha*, *O. liesneri*, *O. glabra*, *O. huberi*, *O. megacarpa*, *O. roseopedunculata*, *O. tomentosa*, *Persea croatii*, *P. croizatii*, and *P. fluviatilis*) are described. *Ocotea julianii* is published as a new name for *Phoebe steyermarkiana*, *Phoebe areolatocostae* is transferred to *Persea*, and *Ocotea steyermarkiana* is transferred to *Rhodostemonodaphne*.

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During the preparation of the treatment of the Lauraceae for the *Flora of the Venezuelan Guayana*, a number of collections were found that appeared to represent undescribed taxa. Most of these collections were gathered during recent expeditions and are of high quality. As can be expected, there are, after completion of the family treatment, still several sterile or fruiting collections that do not match any of the known species from Guayana and that represent additional or even undescribed species. These species could not be included in the treatment for lack of adequate collections.

In general, the Lauraceae in Venezuelan Guayana are still undercollected. Of the 128 species (*Nectandra* excluded; this genus will be contributed by Dr. J. Rohwer), 55 are known only from one or two collections, while an additional 13 are known from three or four collections. This large number of rarely collected species suggests that there are still several additional species to be collected and that our knowledge about Lauraceae in Venezuelan Guayana is far from complete.

The available data show that about one-third of the species (41 out of 128) are endemic to Guayana. Of these 41, 31 species occur on the slopes and summits of the tepuis, while 10 are lowland species. The number of endemic lowland species will likely diminish when adjoining Colombia and Brazil are better explored, because I expect that lowland species such as *Ocotea tomentosa*, *Persea fluviatilis*, and *Phoebe semecarpifolia*, which occur near the borders with Colombia and Brazil, are not restricted to the Venezuelan side of the borders.

The new species, combinations, and the new name are arranged in alphabetical sequence.

***Licaria tomentosa*** van der Werff, sp. nov. TYPE: Venezuela. Bolívar: Chimantá Massif, along trail from Base Camp to Bluff Camp, western slopes of Chimantá-tepui, 1,100–1,700 m, *Steyermark* 75607 (holotype, NY; isotypes, COL, F). Figure 1.

Arbor, ad 10 m. Ramuli teretes, ferrugineo-tomentosi, vetustiores glabrescentes. Folia chartacea, elliptica, 8–11 × 3–4.5 cm, opposita, basi acuta, apice acuminata; supra secus costam nervosque aliquantum tomentosa; subtus ferrugineo-tomentosa. Nervi utroque costae latere 3–5, versus marginem arcuati et conjuncti. Petioli 0.5–1 cm longi, tomentosi, supra plani. Inflorescentiae floresque ignoti. Fructus ellipsoideus, 1.2 × 0.6 cm. Cupula 1.2 cm alta, 1.4 cm lata, extus laevis, margine leviter duplicata, 3 staminibus bilocellatis et 3 staminodiis praedita. Stamina vetera triangularia, locellis extrorso-apicalibus versus apicem aperientibus.

Tree, 10 m tall. Twigs terete, ferruginous tomentose, becoming glabrous with age. Leaves firmly membranaceous, elliptic, 8–11 × 3–4.5 cm, opposite, the base acute, apex acuminate, upper surface with some tomentose pubescence along the midvein and lateral veins, otherwise glabrous, the lower surface ferruginous tomentose, the tomentum wearing off with age; lateral veins 3–5 pairs, immersed above, raised on lower surface, the lateral veins arching upwards and loop-connected. Petioles 0.5–1 cm long, tomentose, not canaliculate. Inflorescence and flowers unknown. Infructescence unknown. Fruit ellipsoid, 1.2 × 0.6 cm when dry. Cupule deeply cup-shaped, 1.2 cm high and 1.4 cm broad, the outside smooth, without lenticels; the margin weakly double-margined, with traces of tomentum and bearing on the inner margin 3 2-celled stamens and 3 staminodia. Old, dried

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<sup>1</sup> I thank the curators of F, G, MERF, MY, MYF, NY, and VEN for making their specimens available. Dr. J. Dwyer kindly checked the Latin descriptions, and John Myers drew the fine illustrations.

<sup>2</sup> Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

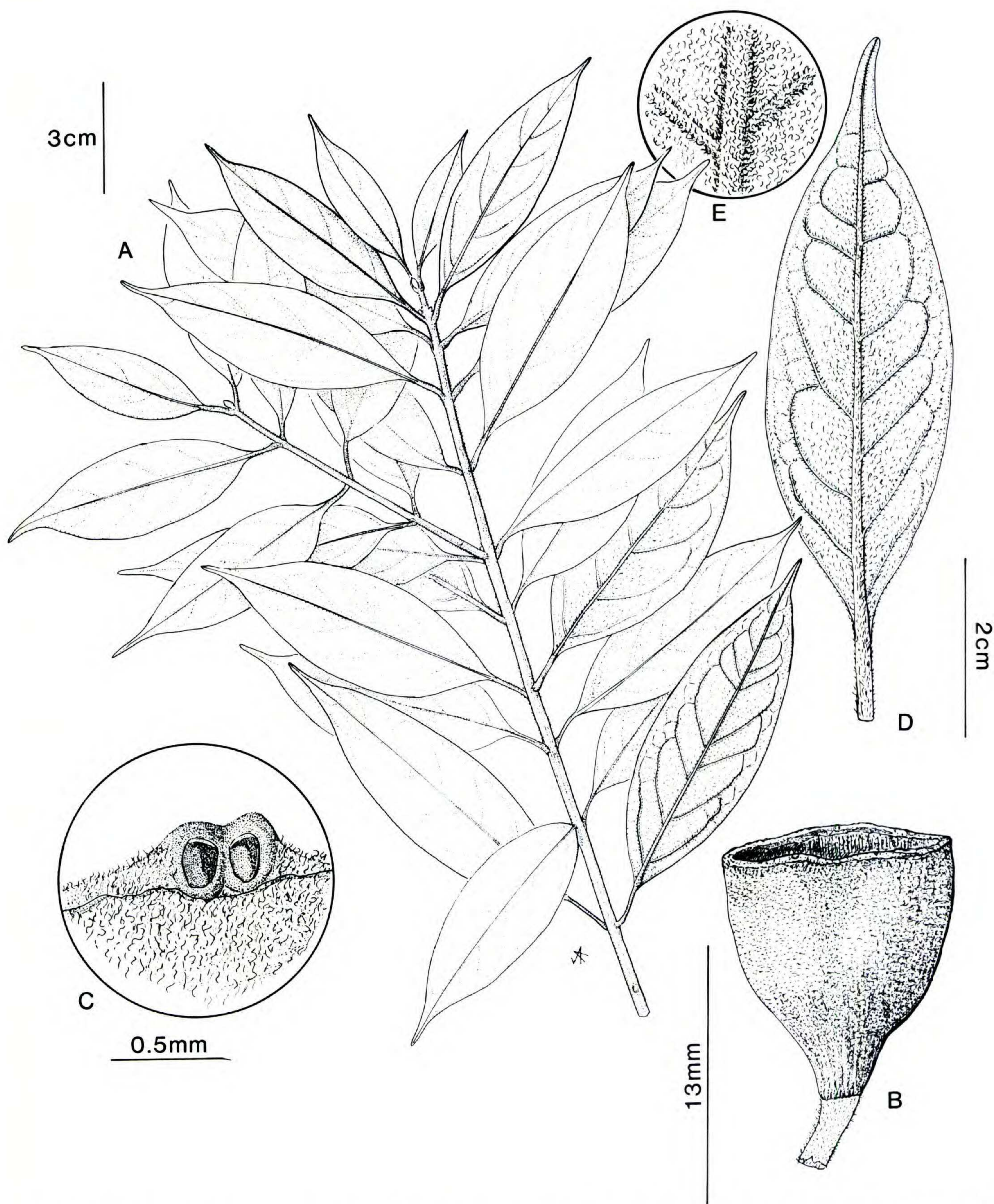


FIGURE 1. *Licaria tomentosa*.—A. Habit.—B. Cupule.—C. Detail of rim of cupule, with old stamen.—D. Leaf.—E. Detail of lower surface of leaf.

stamens triangular, the locelli extrorse-apical and opening towards the tips of the anthers. Staminodia similar in size and shape to stamens but without locelli.

Although the type collection of *Licaria tomentosa* is in fruit, the combination of characters found on the holotype leaves no doubt about the generic identity. Indicative for *Licaria* are the three 2-celled

stamens, the double-rimmed margin of the cupule and the opposite leaves with few, loop-connected lateral veins which stay well away from the margin. The ferruginous-tomentose pubescence of this species readily separates it from the other *Licaria* species with opposite leaves, because these all have appressed pubescence (if any at all), usually with a lighter color.

I am not certain if *Licaria tomentosa* has only three staminodia; the staminodia present on the cupule represent whorl II and are only present when the tepals facing them have not fallen off. The tepals in front of the stamens (whorl III) are absent, and it is likely that staminodia representing whorl I would have fallen off as well.

At present, *Licaria tomentosa* is known only from the holotype in NY (with detached cupules) and sterile isotypes in COL and F. Allen (1964) identified and cited these specimens as *Ocotea roraimae* Mez, a species with alternate leaves, four-celled anthers, a canaliculate petiole, without tomentose pubescence, and lacking loop-connected lateral veins. I consider *O. roraimae* now part of *O. aciphylla* (Nees) Mez sensu lato.

***Ocotea flavantha*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: Dept. Atures, valley of Río Coro-Coro, W of Serranía de Yutaje. Tree, 28 m, flowers dull golden-yellow, *Holst & Liesner 3443* (holotype, MO; isotypes, HBG, NY, VEN). Figure 2.

Arbor, ad 30 m alta. Ramuli hornotini angulati dense brunneo-tomentulosi, vetustiores teretes, indumento adpresso praediti, denique glabrescentes; partes floriferae cicatricibus conspicuis praeditae. Gemma terminalis brunneo-tomentella vel adpresse pubescens. Folia elliptica, 8–12 × 3–5 cm, coriacea, alterna, supra nitida, subtus pallide viridia, apice acuta vel breviter acuminata, basi acuta margine paulo revoluta, supra glabra, subtus paucis pilis adpressis, praesertim prope basim et secus costam, praedita. Venatio pinnata, nervis utroque costae latere 6–9, costa nervisque supra impressis, subtus paulo elevatis. Petioli adpresse brunneo-pubescentes, glabrescentes, nigricantes. Inflorescentiae brunneo-tomentellae vel adpresse pubescentes, ad 10 cm longae, paniculatae, ramulis ad apicem pluri-cymosis; inflorescentiae in axillis bracteatum ad ramulorum apices foliis carentes et cicatricibus praeditas ortae. Flores unisexuales, (sub)sessiles, flavi. Tepala 6, aequalia, utrinque adpresse pubescentia, late ovata, 2.5 × 2.2 mm, sub anthesi erecta. Flos masculinus: stamina 9, 4-locellata, locellis in 2 seriebus dispositis; 6 exteriora ca. 1.6 mm longa, filamentis antheris paulo angustioribus ca. 0.8 mm longis, locellis introrsis; 3 interiora ca. 2 mm longa, filamentis ca. 1 mm longis, fere latitudine antheram aequantibus; glandulis liberis, globosis; staminodia non visa. Pistillodium ca. 2.4 mm longum, praesertim basi pubescens. Tubus floralis pubescens. Flos femineus: (partes florales super fructu juvenali praesentes): staminodia ca. 0.8 mm longa, filamentis anthera perangustiore ca. 0.4 mm longo; locellis obscuris. Stylus triangularis, pubescens. Infructescentiae ad 8 cm longae. Cupula immatura profunda, lenticellata, ad 1.5 cm lata, in pedicellum attenuata.

Tree, to 30 m tall. Twigs (especially when young) angled, becoming terete with age; young twigs with a dense, short, brown tomentum, this soon becoming appressed and finally disappearing on older

twigs; inflorescence-bearing parts of twigs with conspicuous scars from fallen inflorescences. Terminal bud brown-tomentellous to appressed pubescent. Leaves elliptic, 8–12 × 3–5 cm, coriaceous, alternate, smooth and lustrous above, pale green below, apex acute to shortly acuminate, the base acute with slightly revolute margin; glabrous above, with some appressed hairs below (especially near the base of the leaves and along the costa). Venation pinnate, lateral veins 6–9 pairs, costa and lateral veins impressed above, slightly raised below, a fine reticulation rarely apparent (mostly on young leaves). Petioles appressed-brown-pubescent when young, becoming glabrous and black. Inflorescences brown-tomentellous to appressed pubescent, to 10 cm long, paniculate, the branchlets usually with several cymes near their tips; inflorescences frequently arranged on leafless apical parts of twigs, these to 15 cm long and with large scars of old, fallen inflorescences, the entire complex appearing as one terminal inflorescence. Flowers unisexual, sessile or nearly so, yellow. Tepals 6, equal, appressed-brown-pubescent, broadly ovate, 2.5 × 2.2 mm, the inner surface pubescent, erect at anthesis. Male flower: stamens 9, all 4-celled, the cells arranged in 2 rows. Outer 6 stamens ca. 1.6 mm long, the filaments ca. 0.8 mm long, slightly narrower than the anthers, the cells introrse; inner 3 stamens ca. 2 mm long, the filament ca. 1 mm long and about as wide as the anther; glands free, globose, basally attached; staminodia not seen. Pistillode ca. 2.4 mm long, pubescent, especially near the base; ovary and style poorly differentiated. Floral tube pubescent inside. Pistillate flower (based on remnants found on young fruits): staminodia ca. 0.8 mm long, filament and anther ca. 0.4 mm long, filament much narrower than anther, anther cells difficult to see and not opening. Filament dorsally pubescent near the base. Style deciduous, triangular, pubescent; stigma platelike. Top of young fruit pubescent. Infructescences to 8 cm long. Floral parts persisting on young fruits, tepals slightly fused near the base and falling as a unit. Cupule deeply cup-shaped, enclosing ca. ¾ of the young fruit, lenticellate, to 1.5 cm wide, narrowed into the swollen pedicel at the base.

*Paratypes.* VENEZUELA. T. F. AMAZONAS: Dept. Atures, valley of Río Coro-Coro, fr. *Holst & Liesner 3402, 3421* (MO, VEN).

*Ocotea flavantha* is known only from the three type collections in T. F. Amazonas, Venezuela. The nearly sessile flowers, angled twigs, deep cupules, and erect tepals that tend to persist on young fruits place it in the group of *O. glomerata*. Three species



FIGURE 2. *Ocotea flavantha*.—A. Habit.—B. Flowers.—C. Young fruits.—D. Outer stamen.—E. Inner stamen.—F. Pistillode.—G. Style and stigma from young fruit.—H. Staminode.—I, J. Leaf base, seen from below and above.—K. Stem showing scars from fallen inflorescences.—L. Leaf apex.

of this group in the Venezuelan Guayana have a wide distribution (*O. glomerata* (Meissner) Mez, *O. guianensis* Aublet, and *O. longifolia* HBK), but these species have light-colored or very dense pubescence. The color of the indument and the smooth upper leaf surfaces suggest a relationship with the more restricted *O. bracteosa* (Meissner) Mez, *O. cujumary* Martius, and *O. canaliculata* (Rich.) Mez. These three species in Venezuela are known only from the eastern parts of T. F. Delta Amacuro and Estado Bolívar. *Ocotea cujumary* can be readily identified by its double-rimmed cupules; the other two species differ from *O. flavantha* in their glabrous ovary and style and in the absence of leafless, but inflorescences-carrying terminal parts of the twigs. The swollen pedicel supporting the cupule and the rather large (and still immature) cupules are additional distinctive characteristics. Differences in leaf shape are rather subtle. *Ocotea canaliculata* has the petiole poorly differentiated and lacks the weakly recurved leaf base, while *O. flavantha* has an obvious petiole and a slightly recurved leaf base. *Ocotea bracteosa* has larger and wider (to 15 × 6 cm) and more glaucous leaves than *O. flavantha*.

***Ocotea glabra*** van der Werff, sp. nov. TYPE: Venezuela. Bolívar: summit of Carrao-tepui, 2,470–2,500 m, shrub 4–8 ft. tall, *Steysmark* 60897 (f) (holotype, VEN; isotype, F). Figure 3E.

Frutex ad 2.5 m altus. Ramuli crassi, glabri, teretes. Gemma terminalis glabra. Folia obovata vel anguste obovata, 5–8 × 1.5–3 cm, alterna, saepe aggregata, coriacea, basi acuta, apice subacuta vel rotundata, glabra, supra polita. Venatio pinnata; nervi laterales utroque costae latere 6–9, sub angulo 70–80° prodeuntes, supra elevati, subtus quasi immersi. Petioli glabri, crassi, in sicco obscuri, ad 2 mm longi. Inflorescentiae glabrae, spicatae vel anguste paniculatae, pauciflorae, ex axillis bractearum persistentium vel infrequenter foliorum ortae. Flores unisexuales, glabri; tepala 6, aequalia, late elliptica, ca. 2 mm longa, 1.7 mm lata; flos masculinus: stamina 9, 4-locellata, glabra, 6 exteriora locellis introrsis, filamenta ca. 0.6 mm longa; 3 interiora locellis inferioribus extrorsis, locellis superioribus lateralibus, filamenta base glandulis duabus connatis praedita; staminodia non visa; pistillodium lineare, ca. 0.8 mm longum; in flore femineo: staminodia ca. 0.7 mm longa, ovarium glabrum, ellipsoideum, ca. 2 mm longum, stigmatum capitata. Fructus ignotus.

Shrub, to 2.5 m tall. Twigs thick, glabrous, terete, with conspicuous leaf scars. Terminal bud glabrous, usually hidden by the leaves. Leaves obovate to narrowly obovate, widest above the middle, 5–8 × 1.5–3 cm, alternate, somewhat clustered along twigs, coriaceous, the base acute, the apex

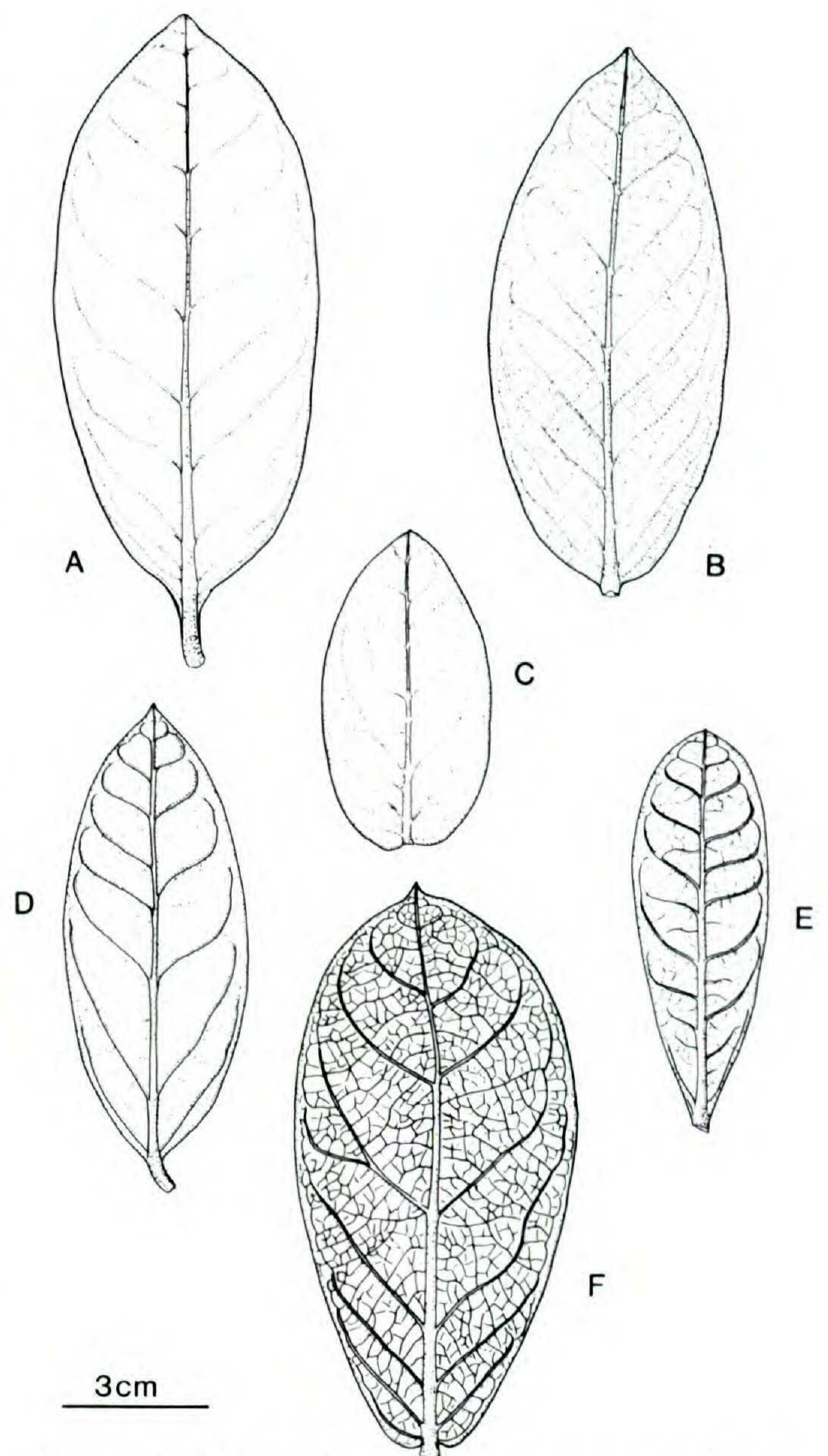


FIGURE 3. Leaf shapes of *Ocotea* species with glabrous twigs, leaves, terminal buds, inflorescences, and flowers.—A. *Ocotea cowaniana* (Cowan 31106).—B. *Ocotea venosa* (Tate 676).—C. *Ocotea erectifolia* (Steysmark 97926).—D. *Ocotea roseopedunculata* (Huber 10127).—E. *Ocotea glabra* (Huber 12003).—F. *Ocotea huberi* (Huber 11008).

very shortly acute to rounded, glabrous, the upper surface shiny, especially on young leaves, the lower surface less shiny. Venation pinnate, lateral veins 6–9 pairs, departing from the midvein under an angle of 70–80°, raised on the upper surface and immersed or nearly so on the lower surface; margin often slightly revolute. Petiole glabrous, to 2 mm long, drying dark. Inflorescences glabrous, ca. 6 cm long, few-flowered, mostly in the axils of persistent bracts, these 5–7 mm long, narrowly elliptic, glabrous. Flowers unisexual, glabrous; staminate flowers with tepals erect at anthesis; tepals 6, equal, broadly elliptic, ca. 2 mm long, 1.7 mm wide; stamens 9, 4-celled, glabrous, the outer 6 stamens with introrse cells arranged in 2 rows, filament and anther both ca. 0.6 mm long; inner

stamens with lower cells extrorse, the upper ones lateral, the base of the filament with 2 large, fused glands; staminodia not seen; pistillode present, linear, ca. 0.8 mm long; pistillate flowers with staminodia ca. 0.7 mm long, the ovary ellipsoid, ca. 2 mm long, glabrous, style lacking, stigma capitate. Fruit unknown.

*Paratype.* VENEZUELA. BOLÍVAR: Municipio Gran Sabana, Caraurén-tepui, ca. 1,950 m, fl, *Huber & Picon 12003* (MYF).

*Ocotea glabra* is known only from two collections from the summits of Carrao- and Caraurén-tepui. It is characterized by being completely glabrous, its (narrowly) obovate leaves, and its venation with lateral veins departing at almost 90° from the midvein. This last-mentioned character occurs also in *O. wurdackiana* Allen, a species restricted to the tepuis of Estado Bolívar. Allen (1964) cited the type collection of *O. glabra* as a paratype of *O. wurdackiana* and described *O. wurdackiana* as having hermaphrodite flowers. Recent collections have shown that *O. wurdackiana* has unisexual flowers, like *O. glabra*. The two species, although superficially similar, can be separated as follows: *O. glabra* is entirely glabrous and has the lower leaf surfaces smooth, while *O. wurdackiana* always has a pubescent terminal bud, the inner surface of the tepals densely pubescent, and the lower leaf surface microscopically papillate.

*Ocotea glabra* has its closest relatives among the ten unisexual *Ocotea* species in the Venezuelan Guayana that share glabrous twigs, leaves, and terminal buds. Two of these have pubescent flowers or inflorescences (*O. myriantha* (Meissner) Mez and *O. perrobusta* (Allen) Rohwer) and are not very closely related. *Ocotea myriantha* is a lowland species, rather common in southern T. F. Amazonas, whereas *O. perrobusta* is restricted to Auyan-tepui, Estado Bolívar. The remaining species in this group have a restricted distribution and are known only from the upper slopes or summits of one or two sandstone mountains. Three have rather large, many-flowered inflorescences: *O. crassifolia* (Sarven-tepui, Roraima), *O. neblinae* (Neblina), and *O. basirecurva* (Serranía de Yutaje, Cerro Coro-Coro). Short, almost spicate, and few-flowered inflorescences, also strongly coriaceous leaves, characterize the last large group of species. Several but not all species in this group have glaucous, clustered, almost sessile leaves, shiny upper leaf surfaces, and lobed or toothed cupules. This group can be subdivided into (1) species from Estado Bolívar, characterized by immersed or elevated costa and lateral veins but without a raised reticula-

tion (*O. erectifolia* (Allen) van der Werff, Cerro Jaua; *O. glabra* van der Werff, Carrao-tepui and Caraurén-tepui; *O. roseopedunculata* van der Werff, Acopán-tepui), and (2) species from T. F. Amazonas with weakly developed lateral veins and raised reticulation on upper and/or lower leaf surface (*O. venosa* Gleason, Cerro Duida, Marahuaca; *O. cowaniana* Allen, Serranía Paru; *O. huberi* van der Werff, Cerro Coro-Coro, Serranía Guanay). *Ocotea glaucophylla* Moldenke, based on material from Cerro Duida, is not well understood; to this small-leaved species also belong collections from Chimantá, revealing an unusual distribution pattern. With the exception of *O. glaucophylla*, these species are well defined by their inflorescence and leaf characters (Fig. 3); they are also geographically separated, and the paucity of collections is probably due to occurrence in inaccessible places. The collection *Maguire 33026* (NY) from Cerro Guaiquinima belongs in this species group (it has glabrous leaves, twigs, and terminal bud, and clustered, glaucous, coriaceous, subsessile leaves) and differs from the other species in its smooth upper leaf surface; it is almost certainly undescribed, but because it is sterile, I do not wish to describe it.

***Ocotea huberi*** van der Werff, sp. nov. TYPE: Venezuela. Bolívar: Distr. Cedeño, Serranía Guanay, ca. 1,700 m, *Huber 11008* (holotype, MO; isotype, MYF n.v.). Figure 3F.

Frutex, ad 3 m altus. Ramuli glabri, juniores subangulares, vetustiores teretes. Gemma terminalis non visa, foliis obtecta. Folia elliptico-oblonga vel leviter obovata, 8–13 × 5–8 cm, coriacea, alterna, basi rotunda vel cordata, apice rotunda vel apiculata, supra polita, praesertim in foliis novellis, subtus subpolita, glauca. Venatio pinnata, nervis lateralibus utroque costae latere 6–8, prope marginem versus apicem curvatis coalitisque; costa utrinque immersa; nervis lateralibus et reticulatione elevata, sed foliis veteribus paulo elevatis. Petioli glabri, crassi, ad 3 mm longi. Inflorescentiae glabrae, flores 5–6 mm diametro; tepalis 6, aequalibus, ovatis, 2–2.2 mm longis, 1.4 mm latis, 3 interioribus pagina interiore paucis pilis praeditis, ceterum glabris; staminibus 9, 4-locellatis, eis seriei primae ca. 1.6 mm longis, antheris ca. 0.9 mm longis, locellis introrsis, filamentis ca. 0.5 mm latis, eis seriei secundae ca. 1.0 mm longis, locellis introrsis, filamentis ca. 0.2 mm latis, eis seriei tertiae ca. 1.4 mm longis, antheris rectangularibus, ca. 0.8 × 0.6 mm, locellis lateralibus, filamentis basi 2 glandulis magnis praeditis; staminodiis 3, ca. 0.5 mm longis, linearibus, basi pubescentibus; ovario ellipsoideo, ca. 1.3 mm longo, sensim in stylum brevem attenuato; stigmatibus capitato. Cupula non profunda, ca. 1 cm lata, margine 6-lobato vel 6-dentato, sensim in pedicellum attenuata. Fructus ovaloideus, 1.5 × 1 cm.

Shrub, 1–3 m tall. Twigs glabrous, subangular when young, becoming terete. Leaves elliptic-ob-

long to slightly obovate, 8–13 × 5–8 cm, alternate, ± evenly distributed along twigs, coriaceous, the base rounded to cordate, the apex rounded to apiculate, the upper surface shiny, especially the young leaves, the lower surface less so, glaucous. Venation pinnate, the lateral veins 6–8 pairs, curving upward towards the margin and becoming connected; midrib immersed on upper and lower surfaces, lateral veins and tertiary venation raised and forming a coarse reticulum, this less visible on older leaves. Petioles glabrous, thick, to 3 mm long, blackish when dry. Inflorescences glabrous, in the axils of persistent leaves, 12–16 cm long, exceeding the leaves, narrowly paniculate. Flowers glabrous, 5–6 mm diam.; tepals 6, equal, ovate, 2–2.2 mm long, 1.4 mm wide, the inner 3 with a few hairs on the inner surface, otherwise glabrous, reflexed in old flowers; stamens 9, the anthers 4-celled; outer 3 (whorl I) ca. 1.6 mm long, the anther ca. 0.9 mm long, cells introrse, the filament ca. 0.5 mm wide; stamens of whorl II ca. 1.0 mm long, cells introrse, the filaments ca. 0.2 mm wide; stamens of whorl III ca. 1.4 mm long, the anther rectangular, ca. 0.8 mm long, 0.6 mm wide, cells lateral; glands at base of filaments free, ca. 0.5 mm long; staminodes 3, linear, ca. 0.5 mm long, pubescent near base; ovary ellipsoid, ca. 1.3 mm long, gradually narrowed into short style, 0.3 mm long; stigma large, capitate. Cupule a shallow cup, ca. 1 cm wide, with 6 teeth or lobes at the margin and gradually narrowed into the pedicel. Fruit ovaloid, 1.5 × 1 cm fide collector.

*Paratypes.* VENEZUELA. T. F. AMAZONAS: Depto. Atures, cumbre del Cerro Coro-Coro, 2,200 m, *Huber 12298* (MO, MYF).

*Ocotea huberi* is restricted to the Departamento Atures and Distrito Cedeño, along the border of Estado Bolívar and T. F. Amazonas. Its closest relative is *O. venosa* Gleason, a species only known from the type collection from Cerro Duida and a fruiting specimen from Cerro Marahuaca, both in T. F. Amazonas. The two species have similarly raised reticulation, toothed or lobed cupules, and swollen fruiting pedicels. They differ in their leaf bases, which are obtuse in *O. venosa* vs. rounded to cordate in *O. huberi*, and in the much shorter inflorescences of *O. venosa*. The types of *O. venosa* (NY, US) do not have open flowers, and I have not compared their floral details; I accept *O. huberi* as a distinct species based on its striking leaf shape and long inflorescences.

The group of species to which *Ocotea huberi* belongs is characterized by unisexual flowers. The MO sheet of *Huber 11008* has two twigs, one in

young fruit, the other in flower. Dissection showed the flowers to be staminate (anthers with well-developed locelli; pistil hollow). Thus, the flowering and fruiting twigs on the type sheet probably came from different plants, and I select the flowering twig as the holotype. Relationships of *O. huberi* are further discussed under *O. glabra*.

***Ocotea julianii*** van der Werff, nom. nov. Based on *Phoebe steyermarkiana* Allen, Mem. New York Bot Gard. 10(5): 74. 1964. TYPE: *Steyermark & Wurdack 921* (holotype, NY; isotypes, F, MO).

*Ocotea julianii* was erroneously described as belonging to the genus *Phoebe* by Allen. The large, cup-shaped cupule excludes this species at once from *Phoebe*, a genus in which the fruit is subtended by a small cupule with the tepals usually persisting. Leaf venation, the large cupule, and the deep floral tube in old flowers all point to the *Ocotea aciphylla* group (I have not seen good flowering material). Because Allen already described *Ocotea steyermarkiana*, a new epithet is needed when *Phoebe steyermarkiana* is transferred to *Ocotea*.

The similarity between *Ocotea julianii* and *Phoebe tetragona* (Meissner) Mez pointed out by Allen (1964) is superficial. Fruiting specimens of the latter species have a cupule typical of *Phoebe*, and the leaves and flowers are glabrous. Distribution also argues against a close relationship, since *P. tetragona* is a cerrado species from Minas Gerais, Brazil. I regard *O. julianii* as closely related to *O. revoluta* Moldenke, a poorly known species from Cerro Duida. This species differs in its narrower, generally smaller leaves with revolute margins and in its smaller, funnel-shaped cupules; both species belong to the *O. aciphylla* group.

***Ocotea liesneri*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: Dept. Río Negro, Cerro Neblina Camp IV, 780 m, *Liesner 16687* (holotype, MO; isotypes, HBG, NY, VEN).

Arbuscula, ad 5 m altus. Ramuli teretes (novelli paulo angulati), glabri. Gemma terminalis glabra. Folia late elliptica vel late ovata, 10–17 × 7–11 cm, coriacea, alterna, apice acuta vel rotundata, basi obtusa vel rotundata, margine paulo revoluta, utrinque opaca. Venatio pinnata, nervis utroque costae latere 5–7, prope marginem versus apicem arcutis et evanescentibus; costa nervisque lateribus supra immersis, subtus elevatis, subtus reticulatione minuta paulo elevata. Petioli glabri, 1.5–2 cm longi, parum canaliculati. Inflorescentiae glabrae, ad 10 cm longae, foliis breviores, paniculatae, ramulis basalibus 2–5-floris, apicalibus unifloris. Pedicelli glabri vel paucis pilis

praediti, 3–4 mm longi. Flores albidii, ad 4 mm diametro, tubo florale infundibuliforme, conspicuo. Tepala 6, aequalia, elliptico-ovata, ca. 1.7 mm longa, intus parte inferiore pubescentia. Stamina 9, 4-locellata, locellis 2 seriebus dispositis; 6 exteriora ca. 1.4 mm longa, filamentum 0.7 mm longo, locellis introrsis, filamentum pubescente; 3 interiora 1.3 mm longa, filamentum 0.7 mm longo, pubescente; glandulis breviter stipitatis, 0.3 mm diametro, locellis inferioribus extrorsis, superioribus lateralibus. Staminiodia 3, linearia, pubescentia, apice incrassata et glabra. Ovarium globosum, 1.1–1.2 mm in diametro, in tubo florale intus pubescente inclusum; style 0.8 mm longo, stigmate non incrassato. Fructus ignotus.

Small tree, to 5 m tall. Twigs terete or slightly angled when young, glabrous. Terminal bud glabrous. Leaves broadly elliptic to broadly ovate, 10–17 × 7–11 cm, coriaceous, glabrous, alternate, evenly distributed along twigs, the tip rounded or acute, the base obtuse or rounded, the margin slightly revolute, both surfaces dull. Venation pinnate, lateral veins 5–7 pairs, arching upwards and disappearing near the margin, midvein and lateral veins immersed on upper surface, raised on lower surface, the lower surface with a slightly raised, fine reticulation, this less visible on the upper surface. Petioles glabrous, 1.5–2 cm long, somewhat canaliculate. Inflorescences glabrous, ca. 10 cm long, shorter than the leaves, paniculate, the lower branchlets with 2–5 flowers, otherwise flowers single, the inflorescences few-flowered. Pedicels glabrous or with very few hairs, 3–4 mm long. Flowers whitish, with a few appressed hairs on the outside, 4 mm diam., floral tube funnel-shaped, conspicuous. Tepals 6, equal, elliptic-ovate, ca. 1.7 mm long, the inner surface pubescent in the lower half. Stamens 9, all 4-celled, the cells arranged in 2 rows; outer 6 ca. 1.4 mm long, both filament and anther 0.7 mm long, the cells introrse, filament rather densely pubescent; inner 3 stamens 1.3 mm long, the filament 0.7 mm long, pubescent; glands shortly stipitate, 0.3 mm diam.; lower pair of cells extrorse, the upper pair lateral. Staminiodia 3, linear, ca. 0.6 mm long, pubescent, but the tip glabrous and slightly swollen. Ovary globose, 1.1–1.2 mm diam., enclosed in the well-developed floral tube, this with pubescent walls; style distinct, ca. 0.8 mm long, not widened into a distinct stigma. Fruits unknown.

Although *Ocotea liesneri*, known only from the type collection, is in all vegetative parts glabrous like *Ocotea erectifolia* and allies, these species are probably not closely related. *Ocotea liesneri* differs from the *O. erectifolia* group, for instance, by having well-developed petioles, a rather lax inflorescence (comparable to but smaller than that of *O. basirecurva*), relatively long and pubescent fil-

aments, and flowers apparently hermaphroditic. The last-mentioned character, difficult to ascertain, needs verification from additional collections. *Ocotea liesneri* seems quite isolated. In the Venezuelan Guayana, the number of hermaphroditic *Ocotea* species is not great; most belong to the *O. aciphylla* group, which always has pubescent flowers and a quite different venation, and the *O. oblonga* group, which has entirely different leaves. The remaining species are also isolated and possess some striking characters; they include *O. rubra* Mez, *O. cymbarum* HBK, *O. esmeraldana* Moldenke, and *O. fasciculata* (Nees) Mez.

***Ocotea megacarpa*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: Depto. Atabapo, Cerro Marahuaca, 1,220–1,350 m, tree, 15 m tall, *Steyermark & Holst 130610* (holotype, MO; isotype, VEN).

Arbor, ad 15 m alta. Ramuli juniores cinnamomeotomentosi, parum angulosi, vetustiores glabrescentes teretesque. Folia coriacea, 15–22 × 5–9 cm, alterna, elliptica, saepe conduplicata, basi obtusa vel acuta, apice acuminata; supra glabra, venatione immersa; subtus juniora cinnamomeo-tomentosa, vetustiora glabra, costa prominenti, nervis paulo elevatis. Nervi utroque costa latere 5–8, arcuati, prope marginem evanescentes. Inflorescentiae floresque ignoti. Fructus ellipsoideus, 5–6 × 3.5–4 cm. Cupula ad 4 cm lata, 1.5 cm profunda, verrucosa.

Tree, 10–15 m tall. Twigs brown-tomentose and weakly angled when young, becoming glabrous and terete with age. Leaves stiff, leathery, 15–22 × 5–9 cm, alternate, elliptic, frequently conduplicate, the base obtuse or acute, the apex acuminate, the upper surface glabrous and with the venation immersed, the lower surface brown-tomentose when young, glabrous with age, the midvein prominent, lateral veins slightly raised, in 5–8 pairs, arching upwards and fading away close to the margin. Petioles 1.5–2 cm long, canaliculate, brown-tomentose when young, glabrescent with age. Inflorescences and flowers unknown. Infructescences with few fruits, glabrous, to ca. 7 cm long. Fruit ellipsoid, 5–6 cm long, 3.5–4 cm wide. Cupule (immature) a cup ca. 3 cm wide and 1.5 cm deep, the outside ridged and warty, the inside glabrous or with a few appressed hairs; mature cupules shallower, 3.5–4 cm wide and to 1.5 cm deep, the outside ridged and warty.

*Paratypes.* VENEZUELA. T. F. AMAZONAS: Depto. Atabapo, Cerro Marahuaca, 1,140 m, *Steyermark & Holst 130555* (MO, VEN); same locality, 1,225 m, *Liesner 17732, 17733* (MO, VEN).

*Ocotea megacarpa* is known only from three fruiting collections from Cerro Marahuaca. Leaf



shape, venation, canaliculate petioles, and the initially deep cups all point to the *Ocotea aciphylla* group. Within this group (and within the genus *Ocotea*), the large fruits and large, shallow cupules are unmatched, and *O. megacarpa* is solely described on the distinctiveness of its fruits and cupules. In the *Ocotea aciphylla* group, *O. julianii* also has large fruits (3.5 × 3 cm) and cupules (ca. 3 cm wide). However, in addition to its smaller fruits and cupules, *O. julianii* differs in its rounded to subcordate leaf bases, short, thick petioles, and blunt to rounded leaf apices. *Ocotea megacarpa* is in leaf shape (but not in indumentum) very similar to *O. aciphylla* (Nees) Mez s.l., especially to the lowland populations in T. F. Amazonas, which have been identified as *O. costulata* (Nees) Mez in the past, but this species has appressed pubescence, cupules to 2 cm wide, and fruits to 2.5 cm long.

***Ocotea roseopedunculata*** van der Werff, sp. nov. TYPE: Venezuela. Bolívar: Distr. Piar, summit area of Acopán-tepui, ca. 1,950 m, fl, Huber, Ahti & Pipoly 10127 (holotype, MO; isotype, MYF n.v.). Figure 3D.

Frutex ad 2.5 m altus. Ramuli glabri, cristati petiolis decurrentibus, foliorum cicatricibus conspicuis praediti. Gemma terminalis glabra. Folia elliptica vel anguste elliptica, raro subovata vel subobovata, 7–11 × 2.5–4.0 cm, coriacea, glabra, basi apiceque acuta, alterna sed plerumque conferta, foliis paucis et minoribus inter folios confertos, supra polita, subtus opaca, glauca. Venatio pinnata, nervis utroque costae latere 6–10, basalibus adscendentibus sed distalibus angulo obtuso prodeuntibus, prope marginem versus apicem curvatis et coalitis; costa nervisque lateralibus supra elevatis sed reticulatione (fere) immersa; subtus venatione quasi immersa. Petioli crassi, glabri, ad 5 mm longi, in sicco nigri. Inflorescentiae glabrae, roseae, folios aequantes vel eis paulo longiores, ex axillis foliorum vel bractearum ortae. Pedicelli glabri, ad 5 mm longi, basi bractea lineare ad 0.5 mm longa praediti. Flores glabri, flavi. Tepala 6, aequalia, ovata, 2.5 × 1.8 mm. Stamina 9, 4-locellata, locellis in 2 seriebus dispositis; 6 exteriora subsessilia, filamentis ad 0.3 mm longis, anthera 1.3 × 1.1 mm, locellis introrsis; 3 interiora ca. 1.5 mm longa, anthera ca. 1 mm longa, locellis lateralibus vel laterali-extrorsis, glandulis magnis, liberis, ca. 0.6 mm in diametro; staminodia non visa; pistillodium parvulum, lineare, ad 0.3 mm longum. Flores feminei et fructus ignoti.

Shrub, to 2.5 m tall. Twigs ridged due to decurrent leaf bases and with conspicuous scars from fallen leaves. Terminal bud glabrous. Leaves elliptic to narrowly elliptic, or rarely somewhat ovate or obovate, 7–11 × 2.5–4.0 cm, coriaceous, glabrous, base and tip acute, alternate, mostly clustered, the few leaves between the leaf clusters usually smaller, the upper surface shiny, the lower surface dull, glaucous. Venation pinnate, lateral

veins 6–10 pairs, the basal ones ascending, the middle and distal ones leaving the midvein under blunter angles, near the margin curving upwards and becoming loop-connected, midvein and lateral veins raised on the upper surface but not on lower, tertiary venation immersed or nearly so on both sides. Petioles thick, glabrous, to 5 mm long, black when dry. Inflorescences glabrous, pink, about as long as the leaves or slightly longer, spicate or the lower branches with 2 or 3 flowers, in the axils of leaves or bracts. Pedicels glabrous, to 5 mm long, with a linear bract ca. 0.5 mm long at the base. Flowers yellow, glabrous. Tepals 6, equal, ovate, 2.5 × 1.8 mm. Stamens 9, all 4-celled and the cells arranged in 2 rows; outer 6 stamens sessile or nearly so, the filament to 0.3 mm long, the anther 1.3 × 1.1 mm, cells introrse; inner 3 stamens ca. 1.5 mm long, anther ca. 1 mm long, the cells lateral or lateral-extrorse, glands large, free, ca. 0.6 mm diam.; staminodia not seen; pistillode very small, linear, ca. 0.3 mm long, completely hidden by stamens and glands, stigma not developed. Pistillate flowers and fruits not known.

*Paratype.* VENEZUELA. BOLÍVAR: Distr. Piar, summit area of Acopán-Tepui, ca. 1,950 m, fl, Huber, Ahti & Pipoly 10120 (MO).

*Ocotea roseopedunculata* is restricted to Acopán-tepui and is currently known from only two collections. Its nearest relative is *Ocotea glabra*, known from Carrao and Caraurén-tepui in Estado Bolívar. These two species are best separated by their leaf characters: *O. roseopedunculata* has elliptic leaves with mostly ascending lateral veins, while *O. glabra* has (narrowly) obovate leaves with the lateral veins leaving the midrib under a blunter angle and more rounded leaf tips. In addition, there are some small floral differences: in *O. glabra* the filaments and anthers of the outer stamens are about equally long and the pistillode is ca. 0.8 mm long; in *O. roseopedunculata* the anthers are subsessile and the pistillode is smaller, 0.3 mm long. The two species share ridged stems, conspicuous leaf scars, almost spicate, few-flowered inflorescences, and a tendency toward clustered leaves. See also discussion under *O. glabra*.

***Ocotea tomentosa*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: San Carlos de Río Negro, IVIC main study site, km 4.3 on Solano Road, small tree 3 m high, flowers white, Clark & Maquirino 6802 (holotype, MO; isotypes, HBG, NY).

Frutex vel arbor parva, ad 3 m alta. Ramuli angulati, hornotini brunneo-tomentosi, vetustiores tomentelli, de-

nique glabrescentes. Gemma terminalis brunneo-tomentosa. Folia elliptica, 15–25 × 6–8 cm, alterna, coriacea, supra praeter pubescentiam basi costae glabra, subtus secus costam nervisque pilis curvatis brunneis praedita et lamina albo-tomentosa vel cinereo-tomentosa; basi apiceque acuta, nervis utroque costae latere 6–8, sursum curvatis et nervo superiore consociatis; venatione supra immersa, costa et nervis subtus elevatis, indumento brunneo venationis tomento albido laminae discrepante. Petioli ca. 1.5 cm longi, brunneo-tomentelli vel subglabri. Inflorescentiae axillares, brunneo-tomentosae, ad 10 cm longae, paniculatae. Pedicelli ca. 1 mm longi, tomentosi. Flores (tantum feminini visi) albi. Tepala 6, aequalia, ovata, ca. 1 mm longa, extus pilis paucis cinereis praedita et minus pubescentia quam inflorescentia, intus subglabra; staminodia 9, ca. 0.3 mm longa, glabra; ovarium ca. 1 mm diametro, stylum inconspicuum, stigma capitatum. Fructus globosus, ca. 1 cm diametro, cupula non profunda, pedicello incrassato, petalis persistentibus.

Shrub or small tree, to 3 m tall. Twigs angular, brown-tomentose when young, becoming tomentellous and finally glabrous. Terminal bud brown-tomentose. Leaves elliptic, 15–25 × 6–8 cm, alternate, coriaceous, glabrous above except some pubescence on midrib, the lower surface with brown curled hairs along midrib and main veins, the leaf tissue white-tomentose, turning grayish with age, base and apex acute, lateral veins 6–8 pairs, these arching upwards and becoming loop-connected with the distal vein; venation immersed on the upper surface, costa and lateral veins raised on lower surface, the venation with brown indumentum contrasting with the white tomentum on the laminar tissue. Petioles ca. 1.5 cm long, brown-tomentellous to glabrous. Inflorescences axillary, brown-tomentose, to 10 cm long, paniculate. Pedicels ca. 1 mm long, tomentose. Flowers white (only pistillate seen). Tepals 6, equal, ca. 1 mm long, ovate, with some gray hairs on the outside and pubescence on tepals much less than on inflorescence or pedicels; inside of tepals with a few hairs or glabrous; staminodia 9, ca. 0.3 mm long, glabrous; ovary ca. 1 mm diam., style not evident, stigma capitate. Fruit a globose berry, ca. 1 cm diam., the cupule shallow, pedicel swollen and the petals persisting as lobes on the margin of the cupule.

*Paratypes.* VENEZUELA. T. F. AMAZONAS: San Carlos de Río Negro, IVIC main study site, fl, *Clark & Maquirino 8216* (MO); Río Guainía, ca. 7 km N of Maroa, frequent in shrub savanna, fr, *Maguire et al. 41755* (NY).

*Ocotea tomentosa* is known only from the upper drainage of the Río Negro between Maroa and San Carlos de Río Negro. Although the area around San Carlos de Río Negro has been reasonably well explored, *O. tomentosa* has only been collected there twice (both collections from the same marked

tree) and is apparently rare. It is very likely present in Colombia and can be expected in Brazil.

The angled twigs, somewhat clustered flowers and, above all, scarce pubescence on the tepals in comparison with that on the inflorescence point to the *Ocotea leucoxylo* group as the closest relatives. None of the species in that group has leaves with dense abaxial tomentum or such persistent tepals in the fruiting stage; moreover, *O. tomentosa* lacks the white lenticels on the cupule that so readily identify the *O. leucoxylo* group.

***Persea areolatocostae*** (Allen) van der Werff, comb. nov. BASIONYM: *Phoebe areolatocostae* C. K. Allen, Mem. N.Y. Bot. Gard. 10: 75. 1964.

The type collection of *Phoebe areolatocostae* has buds and immature fruits. However, the fruits are diseased; the relatively long petioles, leaf shape, and leaf reticulation all point to the genus *Persea*. The equal tepals are a character infrequently found in *Persea*; *P. americana* and a few related species share this character, but *P. areolatocostae* is probably not related to those species. In my opinion, the relationship is with a small group of species characterized by equal tepals, a small, round fruit, and persistent tepals in the fruiting stage. This group includes the neotropical *P. steyermarkii*, *P. rigens*, *P. silvestris*, and a few additional, as yet undescribed, species. It is not yet clear to which degree this group is related to the Asian *Persea* subg. *Machilus*.

***Persea croatii*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: Cerro Neblina, near Cañon Grande at Camp No. 7, ca. 1,800 m, *Croat 59519* (holotype, MO).

Arbor, ad 4 m. Ramuli teretes, sparse adpresse pubescentes, vetustiores glabri. Folia alterna, subcoriacea, elliptica, 7–10 × 2–3 cm, basi acuta, apice obtusa; supra glabra, subtus adpresse pubescentia, sed superficie foliorum pubescentia non occulta, costa nervisque supra immersis, subtus costa elevata sed nervis immersis vel perpaulo elevatis. Petioli canaliculati, 1–2 cm longi, glabri vel leviter adpresse pubescentes. Inflorescentia axillaris, subterminalis, paniculata, ca. 12 cm longa, adpresse cinereo-pubescentis. Pedicelli ca. 4 mm longi. Tepala 6, inaequalia, 3 exteriora ca. 4 mm longa, (anguste) ovata, extus pubescentia, intus glabra; 3 interiora ca. 6 mm longa, anguste ovata, utrinque adpresse pubescentia. Stamina 9, 4-locellata; 6 exteriora 4.5–5 mm longa, locellis introrsis, filamentis pubescentibus, antheris glabris, ca. 1.6 mm longis; 3 interiora locellis lateralibus vel laterali-extrorsis, filamentis pubescentibus, ca. 3 mm longis, basi 2 glandulis praeditis, antheris glabris, ca. 1.5 mm longis; staminodia 3, ca. 1 mm longa, sagittata, pubescentia. Ovarium glabrum vel apice paucis pilis praeditum,

globosum, ca. 1.5 mm diametro; stylo ca. 3 mm longo, pubescente. Fructus ignotus.

Tree, 4 m tall. Twigs terete, sparsely appressed pubescent, becoming glabrous with age. Leaves alternate, subcoriaceous, elliptic, 7–10 × 2–3 cm, evenly distributed along twigs, the base acute, apex obtuse; glabrous on the upper surface, appressed pubescent below, but pubescence not obscuring the leaf surface; costa and lateral veins (6–9 pairs) immersed on upper surface; costa raised on lower surface, lateral veins immersed or very slightly raised on lower surface. Petioles canaliculate, 1–2 cm long, glabrous or with some appressed hairs. Inflorescence axillary, pseudoterminal, paniculate, ca. 12 cm long, appressed gray-pubescent. Pedicels ca. 4 mm long. Tepals 6, unequal; outer 3 ca. 4 mm long, ovate to narrowly ovate, appressed pubescent outside, glabrous inside; inner 3 ca. 6 mm long, narrowly ovate, appressed pubescent on both surfaces. Fertile stamens 9, 4-locellate, the outer 6 with introrse cells, 4.5–5 mm long, filaments densely pubescent, anthers glabrous, ca. 1.6 mm long; inner 3 stamens with lateral or lateral-extrorse cells, 4.5–5 mm long, the filaments ca. 3 mm long, densely pubescent, each with 2 glands attached near the base, anthers glabrous, ca. 1.5 mm long. Filaments of all stamens about as wide as anthers or slightly narrower. Staminodia 3, ca. 1 mm long, sagittate, pubescent. Ovary globose, ca. 1.5 mm diam., glabrous except for some hairs near the tip; style ca. 3 mm long, pubescent.

*Persea croatii* is known from only one collection from the upper slope of Cerro Neblina. The pubescent style and the few apical hairs on the ovary place it in Kopp's (1966) section *Aurataea*, which includes two other species from the Venezuelan Guayana. *Persea grandiflora*, known from the lower slopes of Cerro Neblina, differs in having larger flowers, prominently raised lateral veins on the lower leaf surface, ovate (vs. elliptic) leaves, and much denser pubescence. *Persea maguirei* differs in having smaller leaves, denser pubescence which covers the lower leaf surface, shorter, more slender inflorescences with smaller flowers, and smaller floral parts. In general appearance *P. croatii* is quite similar to *P. perseiphylla*, but *P. croatii* differs in its sparser, noncupreous pubescence on the lower leaf surface and its noncupreous pubescence on flowers and inflorescence.

***Persea croizatii*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: upper Río Orinoco, *Croizat 918* (holotype, F). Figure 4.

Arbor vel frutex. Ramuli teretes, juvenales sparse adpresse pubescentes, glabrescentes. Folia alterna, elliptica, 9–14 × 4–6 cm, firme chartacea, margine paulo reflexa, base apiceque acuta, supra glabra, subtus pilis adpressis praedita, praecipue secus costam nervosque; nervis lateralibus utroque latere 5–6; costa et nervis lateralibus supra immersis, subtus elevatis. Petioli plus minusve glabri, 2–3 cm longi. Inflorescentiae anguste paniculatae, 10–15 cm longae, adpresse pubescentes. Pedicelli ca. 2 mm longi, adpresse pubescentes. Tepala 6, inaequalia; 3 exteriora late ovata, intus glabra, ca. 3 mm longa; 3 interiora ovata, intus adpresse pubescentia, 5–6 mm longa. Stamina 9, 4-locellata; 6 exteriora locellis introrsis, ca. 2 mm longa, filamentis pubescentibus, ca. 1.1 mm longis, antheris glabris, ca. 0.9 mm longis, filamentis quam antheris angustioribus; 3 interiora locellis lateralibus vel extrorsis, ca. 2.5 mm longa, filamentis pubescentibus, basi 2 glandulis praeditis, ca. 1.9 mm longis, antheris glabris, ca. 0.6 mm longis, paulo latioribus quam filamentis; staminodia 3, pubescentia, sagittata, ca. 1.1 mm longa. Ovarium glabrum, globosum; stylo gracile, ca. 1.6 mm longo. Fructus globosus, ca. 8 mm diametro; tepala persistentia, patentia.

Woody plant of unknown size. Twigs terete, with some appressed pubescence when young, soon becoming glabrous. Leaves alternate, elliptic, 9–14 × 4–6 cm, firmly chartaceous, the margin slightly reflexed, base and apex acute, glabrous above, with some appressed hairs below, especially along midvein and lateral veins, or almost glabrous, lateral veins 5–6 pairs; midvein and lateral veins immersed above, raised on lower surface; final reticulation not or very slightly raised. Petioles glabrous or with a few appressed hairs especially near the base, 2–3 cm long. Inflorescences narrowly paniculate, 10–15 cm long, about as long as the subtending leaves, appressed pubescent. Pedicels ca. 2 mm long, pubescent. Tepals 6, unequal; outer 3 broadly ovate, appressed pubescent outside, glabrous inside, ca. 3 mm long, inner 3 appressed pubescent on both surfaces, ovate, 5–6 mm long; tips of inner tepals often breaking off in old flowers or in fruiting stage. Fertile stamens 9, all 4-celled; those of the outer 2 whorls with introrse cells, ca. 2 mm long, the filaments pubescent, 1.1 mm long, the anther glabrous, ca. 0.9 mm long, the filaments distinctly narrower than the anthers; inner 3 stamens linear, ca. 2.5 mm long, the filaments pubescent, ca. 1.9 mm long, with 2 globose glands attached slightly above the base, the anther glabrous, ca. 0.6 mm long, slightly wider than the filament; staminodia 3, pubescent, ca. 1.1 mm long, sagittate. Ovary glabrous, style slender, ca. 1.6 mm long, stigma platelike. Fruit globose, ca. 8 mm diam., with glaucous bloom; tepals persistent, spreading.

*Persea croizatii* is known only from the type collection, made in July–October 1951, along the

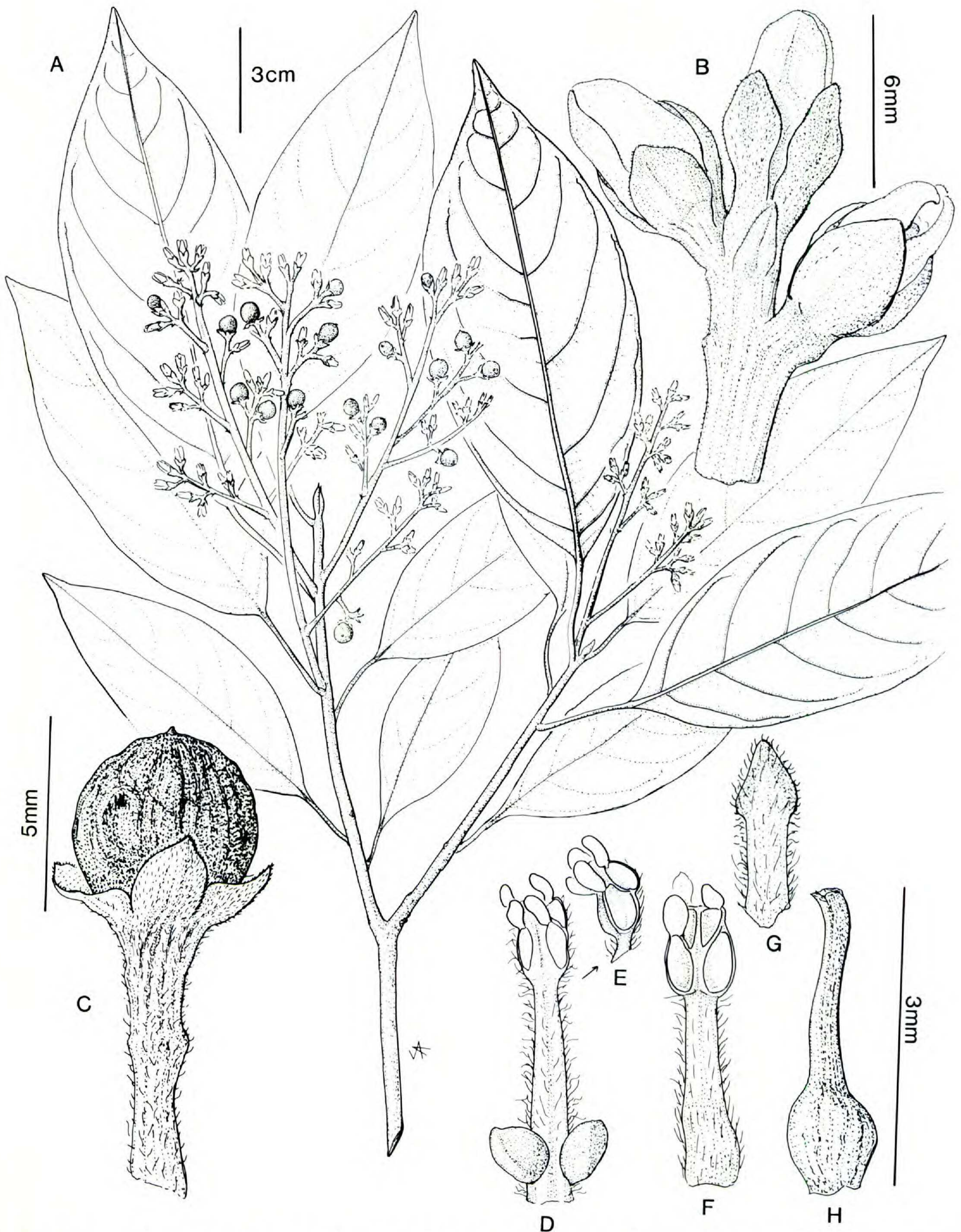


FIGURE 4. *Persea croizatii*.—A. Habit.—B. Old flowers.—C. Fruit.—D. Inner stamen.—E. Arrangement of anther cells of inner stamen.—F. Outer stamen.—G. Staminode.—H. Pistil.

upper Río Orinoco, probably at low elevation. There are no label data indicating habit, size, habitat, or other information. In Kopp's (1966) revision of the neotropical *Persea* species, *P. croizatii* keys to her section *Eriodaphne* because of its glabrous

ovary. It does not seem closely related to any of the species of that section with appressed pubescence, consisting mostly of *P. caerulea* and its relatives, but instead resembles more closely species of section *Aurataea*, especially *P. nivea* Mez and

*P. benthamiana* Meissner. These species both have, however, whitish and more pubescent lower leaf surfaces and smaller flowers. The inflorescences of *P. benthamiana* are also only half as long as the leaves. In all three species, the inner stamens are longer than the outer ones, which is an unusual feature in *Persea*. Unfortunately, all three species are rarely collected, and I have only seen one collection of each. More collections are needed to elucidate the relationships between these three species, whose distributions are not widely separated from each other.

***Persea fluviatilis*** van der Werff, sp. nov. TYPE: Venezuela. T. F. Amazonas: Depto. Río Negro, inundated forest along lower Río Baria, *G. Davidse 27717* (holotype, MO).

Arbor, ad 10 m. Ramuli crassi, fistulosi, hornotini pubescentes annotini glabri. Folia firme chartacea vel coriacea, elliptica vel anguste elliptica, 15–20 × 3.5–7.5 cm, basi acuta vel obtusa, apice acuta; plus minusve aggregata; nervis lateralibus 8–10, supra immersis, subtus elevatis; margine paulo recurvata. Petioli 2–3 cm longi, juvenales pubescentes, vetustiores glabri. Inflorescentiae axillares, foliis perbreviores, dense pubescentes. Flores viridi-lutei, fere sessiles. Tepala 6, subaequalia, extus dense pubescentia; tepala exteriora late ovata, intus glabra, ad 2.5 mm longa; tepala interiora late ovata, intus pubescentia, ca. 3.2 mm longa. Stamina 6 (series I et II), quadrilocellata, ca. 2.2 mm longa; filamentis pubescentibus, sensim in antheris glabris dilatatis; staminodia serei III ca. 1.9 mm longa, dense pubescentia, ad basim 2 glandulis praedita; staminodia serei IV sagittata, ca. 1 mm longa, dense pubescentia. Ovarium paucis pilis praeditum, ca. 0.8 mm diametro; stylo glabro, gracili, ca. 1.5 mm longo. Fructus globosus; tepala persistentia, patentia; pedicellum at maturitatem fructus incrassatum.

Tree, to 10 m. Twigs stout, terete, hollow, the leaf scars clustered, not evenly distributed along the twigs, older twigs glabrous, recent growth with rather dense, spreading pubescence. Leaves firmly chartaceous or coriaceous, elliptic or narrowly elliptic, 15–20 × 3.5–7.5 cm, apex acute, base acute or obtuse, ± clustered along the twigs; lateral veins 8–10 pairs, immersed on the upper surface, prominently raised on the lower surface, arching towards the tip of the leaf, not connected to the upper lateral vein; margin slightly recurved; upper leaf surface glabrous, lower leaf surface with some erect, gray hairs, these denser along midvein and lateral veins. Petioles 2–3 cm long, gray pubescent when young, glabrous in age. Inflorescences axillary, much shorter than the leaves, to 6 cm long, densely gray pubescent. Flowers greenish yellow or tawny, nearly sessile. Tepals 6, their outside surfaces completely covered by dense, gray pubescence, outer 3 tepals broadly ovate, ca. 2.5

mm long, glabrous inside, inner 3 broadly ovate, ca. 3.2 mm long, pubescent inside. Fertile stamens 6, representing the outer 2 whorls, ca. 2.2 mm long, the filament densely pubescent, ca. 1.2 mm long, gradually widened into and poorly differentiated from the glabrous anther; staminodia of whorl III ca. 1.9 mm long, densely pubescent and with 2 large, globose glands near the base, the tip not cordate or sagittate; staminodia of whorl IV ca. 1 mm long, densely pubescent, sagittate. Ovary with a few hairs, 0.8 mm diam., style glabrous, slender, ca. 1.5 mm long. Fruit globose, ca. 1.3 cm diam., with a glaucous bloom; tepals persisting in fruiting stage, spreading; pedicel in fruit strongly swollen, to 7 mm thick.

*Paratypes.* VENEZUELA. T. F. AMAZONAS: along Río Temi near Yavita, *Ll. Williams 14122* (F); same locality, *Bunting et al. 4041, 4050* (MY).

*Persea fluviatilis* is known only from periodically inundated forest in Territorio Federal Amazonas, Venezuela, at elevations of about 100 m. In Kopp's (1966) revision of the neotropical species of *Persea*, it keys to section *Heteranthera* because the stamens of whorl III are sterile. Within that section, it is closest to *P. meridensis*, a poorly known Andean species, which differs in its ferruginous pubescence, pedicelled flowers, and solid twigs. Unusual characters of *P. fluviatilis* are the subequal tepals, hollow twigs, clustered leaves, difference in pubescence between the young and old twigs, and swollen pedicels in fruit. Because many of the neotropical *Persea* species are infrequently collected and are poorly known, close relatives of this distinctive species have not been pinpointed. The swollen pedicels in fruit are a very unusual feature, but because there are only two fruiting collections known, it is possible that this condition is caused by a disease and is not typical for the species. At the time of her revision Kopp had only a fruiting collection of this species at hand, which she cited as *P. nivea* Mez, a species that does not occur in Venezuela.

***Rhodostemonodaphne steyermarkiana*** (Allen) van der Werff, comb. nov. BASIONYM: *Ocotea steyermarkiana* C. K. Allen, *Acta Bot. Venez.* 2: 216. 1967.

*Rhodostemonodaphne*, as defined by Rohwer & Kubitzki (1985), includes a small number of species previously included in *Nectandra* or *Ocotea* and differing from *Nectandra* in being dioecious and in a general lack of papillose pubescence on the floral parts; they differ from *Ocotea* in having almost sessile anthers and the locelli ar-

ranged in an arc, not in two superposed rows. A study of the available collections of *O. steyermarkiana* shows that this species has all the characters of *Rhodostemonodaphne*, and therefore a new combination is made. I did not find that the outer stamens have distinct filaments and that the anther cells are arranged in two rows, as Allen described and illustrated. Pubescence and inflorescence type suggest that *R. steyermarkiana* is closely related to *R. celiana* (Allen) Rohwer and *Endlicheria vinotincta* Allen, both endemic to the Venezuelan Guayana. I include two collections from Cerro Sarisariñama, cited by Bernardi in Steyermark (1976) as *O. celiana* Allen and *O. ferruginea* (Meissner) Mez, in *R. steyermarkiana*.

LITERATURE CITED

- ALLEN, C. K. 1964. Lauraceae. In: B. Maguire, J. J. Wurdack, et al., The Botany of the Guayana Highland, Part III. Mem. New York Bot. Gard. 10(1): 44-123.
- KOPP, L. 1966. A taxonomic revision of the genus *Persea* in the Western Hemisphere. Mem. New York Bot. Gard. 14(1): 1-120.
- ROHWER, J. & K. KUBITZKI. 1985. Entwicklungslinien im *Ocotea*-Komplex (Lauraceae). Bot. Jahrb. Syst. 107: 129-135.
- STEYERMARK, J. 1976. La vegetación de la cima del macizo de Jaua. Soc. Ven. Ci. Nat. Bol. 132/133: 179-405.